

Denver & Rio Grande Corridor Evaluation

2.2.1 Summary of Approach for Supplemental EIS

2.1.1.1 Updates Since Previous Final EIS

The appellate court remand of the Legacy Parkway Final EIS stated that the elimination of the Denver & Rio Grande Railroad (D&RG) Corridor Alternative based on high costs and substantial impacts on existing development was insufficiently substantiated under NEPA and the federal Clean Water Act (CWA). The court held that the lead agencies failed to verify the cost estimates used to eliminate the D&RG regional corridor and to select the Great Salt Lake regional corridor. The court also held that there was insufficient information in the administrative record regarding the project's cost-estimating methodology to meet NEPA goals of informed decision-making and meaningful public comment. Regarding the CWA in particular, the court stated that the Corps's issuance of the Section 404 permit was arbitrary and capricious because the administrative record lacked quantifiable evidence regarding the "high impacts on existing development" cited as part of the rationale for eliminating the D&RG regional corridor. In addition, although not directed specifically at the elimination of the D&RG regional corridor, the court found that the Corps failed to consider whether a narrower right-of-way was a practicable alternative.

The lead agencies requested that UDOT reexamine the right-of-way needed for all build alternatives considered in the Final EIS, including the D&RG regional corridor alignment alternative, to ensure that the cost estimates are based on the right-of-way width necessary at that location. For more information, see the right-of-way technical memorandum (HDR Engineering 2005a). The lead agencies also requested that UDOT provide updated cost estimates and documentation of the cost-estimating methodology for all five regional corridors initially evaluated in the Final EIS.

To provide quantitative information on the impacts of the D&RG regional corridor in particular, the lead agencies requested that UDOT further refine the D&RG regional corridor by creating five specific conceptual alignments within this corridor and evaluating them using a methodology similar to the one used to evaluate the regional corridors in the Final EIS, but at a much greater level of detail.¹ The cost estimates and methodology documentation were then reviewed by lead agency staff, their independent consultants, and the cooperating agencies. As part of the review, public comments received during the public scoping process and the July 2003 community planning information committee (CPIC) meeting regarding conceptual highway alignments within the D&RG regional corridor were incorporated into the evaluation. In addition to participating in the CPIC meetings, local community planners from Davis

¹ Agencies do not normally develop alignments with this level of detail to evaluate regional corridors at the planning stage. However, because of the court's concerns and public interest, the D&RG regional corridor was evaluated at a greater level of detail herein than the other regional corridors that were rejected in the Final EIS.

County and the Cities of Woods Cross, North Salt Lake, Farmington, Centerville, and West Bountiful were individually interviewed to identify specific, localized impacts associated with potential alignments within the D&RG regional corridor.

The information contained in this section is based on the D&RG technical memorandum (HDR Engineering 2004a).

2.2.1.2 Changes since the Draft Supplemental EIS

Since publication of the Draft Supplemental EIS in December 2004, UDOT has updated the analysis of the design of Alternative E. This updated analysis indicated that a larger acreage of wetlands could be avoided under Alternative E as a result of design flexibility (i.e., the opportunity for the design engineer to modify, consistent with design standards, facility components). Specifically, the Draft Supplemental EIS stated that approximately 6 ha (14 ac) of wetlands in the right-of-way of Alternative E could be avoided through design/build flexibility, which affected the acreage of wetlands impacts presented in 2.2.3.2, *Impacts on Wetlands*. The updated analysis conducted since the Draft was published indicates that approximately 4 ha (10 ac) of wetlands in the right-of-way of Alternative E could be avoided through design/build flexibility, a reduction of 1.6 ha (4 ac). This reflects a reduction in the acreage of wetlands that could potentially be avoided in the Alternative E right-of-way between Parrish Lane and Glovers Lane.

The number of platted lots in the study area has increased since publication of the Draft Supplemental EIS. This increase affected information presented in Section 2.2.3, *Evaluation of D&RG Conceptual Alignments*. As noted in Table 2.2-3, the number of cul-de-sacs and cut-off roads required under D&RG alignments 2, 3, 4, and 5 increased. Similarly, the length of retaining walls and noise walls that would be needed for noise abatement in the vicinity of the newly platted lots also increased under all D&RG alignments (see Tables 2.2-3 and 2.2-5).

Alignment-specific cost estimates were also revised since publication of the Draft Supplemental EIS, based on a review by FHWA. The costs presented in Tables 2.2-9 and 2.2-10 represent updated material quantity estimates and reflect 2005 prices.

2.2.2 Summary of D&RG Analysis

In the Final EIS, five regional alignments (Great Salt Lake, Antelope Island, Trans-Bay, Farmington Bay, and the railroad regional alignment) were evaluated at a corridor-planning level and compared by cost, impacts on wetlands, and impacts on existing developed areas. The regional corridors were labeled as having high, medium, and low impacts in these three categories. Based on the Final EIS evaluation, the Great Salt Lake regional alignment was selected because it balanced medium impacts on environmental resources (wetlands) and impacts on local communities and businesses (existing development) with a reasonable estimated cost. The Antelope Island, Trans-Bay, and Farmington Bay regional alignments were eliminated because of their high costs and impacts on wetlands. The railroad regional alignment was eliminated in the Final EIS because of its high impacts on local communities and businesses as well as high costs. (The railroad regional alignment analyzed in the Final EIS included alignments along both the D&RG and UPRR railroads. It is referred to as the D&RG regional corridor from this point forward in the Supplemental EIS.) The Supplemental EIS updates the information contained in the Final EIS regarding the following topics.

- Cost estimates for the five regional corridors evaluated in the Final EIS.

- Development of five conceptual alignments within the D&RG regional corridor to allow more detailed evaluation of the high impacts on existing development and the costs relied on in the Final EIS.
- Quantification of impacts on existing development, which include relocation impacts; impacts on community cohesion (including impacts on schools and churches); impacts on travel patterns, accessibility, and walkability; noise and visual impacts; and impacts on environmental justice populations.
- Quantification of impacts on wetlands.
- Refinement of cost estimates for the D&RG regional corridor and conceptual alignments based on the appropriate and necessary right-of-way width.

2.2.2.1 Development of D&RG Conceptual Alignments

To evaluate the reasonableness and practicability of a highway within the D&RG corridor, UDOT developed five conceptual alignments within the corridor: DRG1 through DRG5. These conceptual alignments are shown in Figure 2.2-1. These alignments represent attempts to find a technically feasible, reasonable, practicable alignment through the D&RG corridor that avoids or minimizes wetlands and development impacts. All the D&RG conceptual alignments include the multi-use trail as a component of the right of way for reasons discussed in Section 3.3.4 of the Supplemental EIS.

To accommodate the D&RG conceptual alignments and because of the location of the southern interchange, the D&RG regional corridor depicted in the Final EIS needed to be expanded. The corridor was expanded to the west through North Salt Lake, Woods Cross, and West Bountiful to meet the eastern boundary of the Great Salt Lake regional corridor.

Criteria for D&RG Conceptual Alignments

The following criteria and methodology were used to develop the five D&RG conceptual alignments.

- Avoid properties that are eligible for the National Register of Historic Places (NRHP).

The existing D&RG railroad right-of-way is eligible for the NRHP. Therefore, the D&RG alignments cannot lie within the D&RG right-of-way; they must be placed adjacent to the right-of-way (except at rail crossings, where the alignments could lie within the right-of-way). The D&RG is also protected under Section 4(f) of the U.S. Department of Transportation Act of 1966² because of its eligibility as an NRHP historic resource.
- Avoid the most densely developed residential and commercial areas.
- Avoid direct impacts that would require relocating an oil refinery.

² Section 4(f) of the U.S. Department of Transportation Act of 1966 requires the selection of an alternative that avoids designated public parks, recreation areas, wildlife refuges, and historic sites if a prudent and feasible alternative exists.

UDOT assumed that the impacts from taking an oil refinery would make the alignment unreasonable and impracticable because of the high cost of relocation and because the site would likely require extensive cleanup of hazardous materials.

- Avoid properties that would likely be subject to Section 4(f) regulations, such as the Lakeside Golf Course (also called the West Bountiful Golf Course), which is a publicly owned recreation facility.

Conceptual alignments DRG1 and DRG2 traverse the farthest south before cutting west to link back with I-215. DRG1 and DRG2 avoid all identified parks (Hatch, Hogan Memorial, Clover Dale, Mills, and West Bountiful City) by going around them on the south. All alignments traverse east of the Lakeside Golf Course. Any alignments that would traverse northeast on the northern side of Lakeside Golf Course would essentially be located in the Great Salt Lake regional corridor. Alternative D (Final EIS Preferred Alternative) is located in the Great Salt Lake regional corridor; Alternative E, which has the same alignment as Alternative D but has a narrower right-of-way, is used in this analysis as a comparison for the D&RG conceptual alignments.

- Avoid active rail lines.

The rail lines considered in the Final EIS and the Supplemental EIS include those that are actively being used. The D&RG rail line is still active from the southern end of the North Corridor to 400 North in West Bountiful, and provides a freight transportation link to the petroleum refineries in North Salt Lake, Woods Cross, and West Bountiful. UDOT assumed that taking this active rail line would require relocating it to continue to serve these industrial users. Therefore, in active areas, the roadway was located alongside the rail right-of-way to avoid relocating an active rail corridor. The average width of the rail right-of-way through this area is 18.3 m to 30.5 m (60 ft to 100 ft). If an alignment used the railroad right-of-way, UDOT would need to purchase additional acreage of right-of-way to accommodate a roadway within the rail corridor.

- Have a variable right-of-way width that is only as wide as necessary.

To minimize impacts on wetlands and existing development associated with the D&RG conceptual alignments, UDOT used a variable right-of-way width. In areas with wetlands, 4(f) resources, or existing development (i.e., residences and existing businesses), the alignments are reduced to 80 m (264 ft); in all other areas, a 95-m (312-ft) right-of-way is used. (See Figure 2.1-5 of Section 2.1 for cross section of an 80-m (264-ft) reduced footprint for information on the components of the similar 80-m (264-ft) right-of-way used in the D&RG analysis.)

- Follow the Alternative E alignment from about Parrish Lane north to the northern project terminus.

Through this portion of the study area, a relatively narrow strip of land between Farmington Bay and the existing developments on the foothills of the Wasatch Mountains is the only land corridor available for a highway alignment west of I-15. In this area, the Great Salt Lake and D&RG corridors overlap. The Final EIS found that the Alternative D (Final EIS Preferred Alternative) alignment was the least environmentally damaging practicable alternative because of its location relative to the lakeshore and the associated wetlands. The Alternative E alignment analyzed in this Supplemental EIS is the same as the Alternative D alignment, except that Alternative E has a narrower right-of-way.

Description of D&RG Conceptual Alignments

As originally conceived and in its purest form, a D&RG alignment would follow a route along the D&RG right-of-way beginning at I-215 near the I-15 interchange. However, the engineering analysis performed by HDR for UDOT indicated that a southern interchange where the D&RG tracks meet I-215 would be

impracticable and unreasonable because of impacts, poor functionality, and physical constraints.³ Therefore, the southern terminus of the D&RG conceptual alignments is at I-215 to the west of the D&RG tracks, at the same southern interchange location proposed for all the build alternatives. All D&RG conceptual alignments follow the same alignment as Alternative E north of Parrish Lane (through Centerville and Farmington [Parrish Lane to I-15/US-89]), and use a northern terminus that provides a system-to-system connection between I-15, US-89, and the proposed alternative at the northern end.⁴

Except at rail crossings, none of the D&RG conceptual alignments lies within the D&RG right-of-way. South of 400 North, the rail line is active and the conceptual alignments parallel the tracks on the west. North of 400 North, the conceptual alignments cross the tracks to avoid the Lakeside Golf Course, a Section 4(f) property. DRG1 and DRG2 follow the tracks for the longest length—from North Salt Lake to Parrish Lane in Centerville. DRG3, DRG4, and DRG5 follow the tracks through West Bountiful and Centerville only. Figure 2.2-1 shows the five conceptual alignments.

The five D&RG conceptual alignments and the locations where they would vary from Alternative E are described below.

- **DRG1.** From the southern interchange at I-215 to the west of the D&RG tracks, DRG1 runs north past Center Street and northeast to cross Redwood Road at 200 North. The alignment continues northeast to the D&RG tracks, where it runs along the western side of the D&RG tracks to avoid refineries and the active portions of the D&RG line that extend north to 400 North. At 400 North, DRG1 crosses the tracks to avoid the Lakeside Golf Course, a Section 4(f) property, and runs parallel to the tracks on the east, where it then meets and follows the Alternative E alignment through the remaining northern portion of the study area. DRG1 is the alignment that follows the D&RG right-of-way for the greatest distance.
- **DRG2.** From the southern interchange at I-215 to the west and south of the D&RG tracks, DRG2 runs north past Center Street then northeast to cross Redwood Road between 200 North and 900 North (farther north than DRG1), continuing northeast until it intersects with 2600 North. At 2600 North, the alignment turns north and travels along the western side of the D&RG tracks. Like DRG1, this alignment runs on the western side of the D&RG tracks to 400 North, then crosses the tracks to avoid the Lakeside Golf Course and parallels the tracks on the east, where it then meets and follows the Alternative E alignment.
- **DRG3.** DRG3 follows Alternative E from the southern interchange at I-215 to the west and south of the D&RG tracks through North Salt Lake into Woods Cross. The alignment diverges from the Alternative E alignment just south of 1500 South in Woods Cross and runs east then north toward the 500 South interchange. DRG3 follows the D&RG tracks on the west to 400 North before crossing the tracks to avoid the Lakeside Golf Course. The alignment then turns north to parallel the D&RG tracks on the east, where it then meets and follows the Alternative E alignment.
- **DRG4.** DRG4 is identical to DRG3 through North Salt Lake where it crosses into Woods Cross. DRG4 diverges from Alternative E just south of 1500 South in Woods Cross and continues northeast to the 500 South interchange (on a more westerly alignment than DRG3), before turning to head east

³ An interchange where the D&RG tracks meet I-215 would require a three-level bridging system to accommodate all highway-to-highway movements, the possible relocation of two oil refineries, and excavation of mountainous terrain to provide adequate accommodation of traffic to and from I-15, I-215, and Legacy Parkway. For additional information, see Section 2.1.1 of the D&RG technical memorandum.

⁴ The Final EIS examined four locations for a northern terminus. See page 2-24 of the Final EIS for the locations and rationale behind the selection of the locations.

to intersect the D&RG tracks. This alignment then turns north to parallel the D&RG tracks on the east, where it then meets and follows the Alternative E alignment.

- **DRG5.** DRG5 follows the same alignment as DRG4 to the 500 South interchange. Unlike DRG4, this alignment continues northeast to intersect the D&RG tracks north of 400 North. DRG5 then turns north just past where the D&RG tracks become inactive, and goes around the Lakeside Golf Course. The alignment parallels the D&RG tracks on the east, where it meets and follows the Alternative E alignment.

2.2.3 Evaluation of D&RG Conceptual Alignments

To be consistent with the Final EIS, UDOT evaluated the alignments according to the following criteria.

- Impacts on existing development.
- Impacts on wetlands.
- Costs.

The findings of this evaluation are presented on two levels. First, each of the five D&RG conceptual alignments was evaluated in its entirety—from terminus to terminus—and the impacts of those alignments were compared to the impacts of Alternative E. Second, because the D&RG alignments and Alternative E are the same through much of the North Corridor, the study area was divided into five segments or “links” to help identify where impacts actually occur and where they differ along the conceptual alignments. This approach was similar to the process used in Section 2.4.1 of the Final EIS for the Great Salt Lake Regional corridor. The five links are described below. As discussed below, the conceptual alignments are identical to the Alternative E alignment in Links 1, 4, and 5, but differ in Links 2 and 3.

- Link 1 encompasses the southern interchange north through and including Center Street. All five of the D&RG conceptual alignments and Alternative E are identical in Link 1.
- Link 2 covers North Salt Lake and about half of Woods Cross. The boundary between Link 2 and Link 3 is located where conceptual alignments DRG3, DRG4, and DRG5 diverge from Alternative E.
- Link 3 extends from the northern end of Link 2 to just south of Parrish Lane in Centerville. Its location was intended to highlight the segments where all the D&RG alignments differ from Alternative E.
- Link 4 goes through Centerville to just south of State Street in Farmington. All the alternative alignments are identical in Link 4.
- Link 5 encompasses the northern interchange. All the alternative alignments are identical in Link 5.

Each alignment was then evaluated link by link to compare the similarities and differences among the various conceptual alignments and the differences between the conceptual alignments and Alternative E. Information on all the quantitative impacts of each link of the various alignments is summarized at the

end of this section. However, only the impacts of Links 2 and 3 are discussed in detail because the impacts of the D&RG alignments and Alternative E are identical in Links 1, 4, and 5.

2.2.3.1 Impacts on Existing Development

In the Final EIS, the D&RG regional corridor was rejected due in part to the “high impact on existing land development.” This section documents the impacts of the D&RG conceptual alignments on existing development and defines the high impact that lead agencies found to be unreasonable. All the numbers and analysis in this section are based on the refined D&RG conceptual alignments and reflect a more detailed level of analysis than was conducted for the Final EIS.

“Impacts on existing development” essentially means impacts on the built environment, which in turn means impacts on people, communities, utilities, and public and social institutions. To fully ascertain those impacts, the scoping process for this Supplemental EIS gathered information on both quantifiable and non-quantifiable impacts associated with D&RG alignment alternatives. Through public scoping, the communities in the study area identified specific community impacts associated with alignments in the D&RG regional corridor. In general, the communities did not support building Legacy Parkway along any alignment in the D&RG regional corridor because of the following impacts.

- Severe residential and business displacements.
- Loss of community cohesion and quality of life.
- Inconsistency with general plans.
- Loss of tax base.
- Visual and noise impacts and vehicle emission pollution.
- Negative impacts on travel patterns and accessibility (longer trips for emergency vehicles to access existing development west of the D&RG alignments and longer trips for daily activities).

In particular, communities were concerned that a major new roadway in the D&RG corridor would create a physical and social barrier in the area that would sever neighborhoods and communities west of the alignments and negatively affect community cohesion. (See the D&RG technical memorandum for additional details on the impacts of specific D&RG conceptual alignments.) Based on these community concerns, UDOT conducted a community cohesion analysis to more accurately quantify these community impacts. The results of the community cohesion analysis are incorporated into this section.

Impacts on existing development include the following impacts, which are discussed at length below.

- Relocation impacts (residential, business, and utilities).
- Impacts on community cohesion, including impacts on schools and churches.
- Impacts on travel patterns, accessibility, and walkability.
- Noise and visual impacts.

- Impacts on Section 4(f) and historic properties.
- Impacts on environmental justice populations.

Relocations

Table 2.2-1 identifies relocation impacts associated with each of the D&RG conceptual alignments on residences, businesses, and major utilities.⁵ Table 2.2-1 presents the impacts for the municipalities that would be most affected by the D&RG alignments (North Salt Lake, Woods Cross, and West Bountiful). Impacts on the two other municipalities in the study area (Centerville and Farmington) would be the same under the D&RG alignments as under Alternative E. Table 2.2-1 also identifies the impacts of the D&RG Alignments on new residential developments that have been platted or developed since publication of the D&RG technical memorandum and Draft Supplemental EIS. These new residential developments include Valentine Estates and Mountain View in Woods Cross and Birnam Woods in West Bountiful, as well as construction within the Foxboro development in North Salt Lake. Some of these platted lots contain homes, and some are currently being developed. Impacts on lots containing a home may result in a relocation impact. Due to ongoing active construction, the number of lots affected represents potential relocation impacts and is the minimum number of additional relocations for the D&RG conceptual alignments.⁶

The relocation impacts on existing development under the D&RG conceptual alignments range from 149 to 279 residential and business relocations and from 13 to 28 major utility relocations. The D&RG conceptual alignments would also affect between 36 and 70 residential lots and sever 30 percent of the West Bountiful community to the west of the D&RG conceptual alignments. The relocation impacts on existing development under Alternative E would be 18 residential and business relocations and 21 major utility relocations (see Figure 2.2-2). There would be no impacts on newly platted residential lots associated with Alternative E. All D&RG alignments would result in an approximate 10 percent reduction in the total number of existing households in West Bountiful; DRG1 and DRG2 would result in a 3.5 percent reduction in the total number of households in Woods Cross. These relocation impacts would have corresponding negative impacts on the local tax base and remaining neighborhoods.

⁵ Buildings within an alignment's right-of-way were included in the calculations of the number of relocations. Relocation impacts were determined using aerial imagery, Davis County parcel information, tax records, and field surveys to distinguish between residential and industrial/business structures and between a main building and an ancillary feature such as a barn or shed. A full description of the methodology for determining relocation impacts is presented in Section 5.4 of the D&RG technical memorandum.

⁶ Although a narrower (80-m [262-ft]) footprint was used to minimize impacts in areas of existing development, the 95-m (312-ft) right-of-way was used for the D&RG alignments in the areas associated with new platted developments because the extent of the developments was not fully known at the time the analysis was completed.

Table 2.2-1 Comparison of D&RG Alignment Relocations with Alternative E Relocations

Alignment (right-of- way width)	Identified Relocations	Residential Relocations as Percentage of Total Households			Residential Platted Lots ¹	Major Utility Impacts
		North Salt Lake	Woods Cross	West Bountiful		
Alt E (95 m)	Residential–4 Business–14 Total–18	NA ²	NA ²	NA ²	0	Petroleum–5 Water–6 Power–5 Gas–5 Total–21
DRG1 (80–95 m)	Residential–193 Business–86 Total–279	0	3.5	9.3	0	Petroleum–13 Water–15 Total–28
DRG2 (80–95 m)	Residential–196 Business–46 Total–242	<1	3.5	9.3	Foxboro–70	Petroleum–9 Water–13 Total–22
DRG3 (80–95 m)	Residential–129 Business–39 Total–168	0	<1	9.5	Mountain View–36	Petroleum–4 Water–9 Total–13
DRG4 (80–95 m)	Residential–128 Business–21 Total–149	0	1	8.9	Mountain View–36	Petroleum–4 Water–10 Total–14
DRG5 (80–95 m)	Residential–139 Business–20 Total–159	0	1	9.8	Mountain View–36	Petroleum–4 Water–9 Total–14
Notes:						
¹ None of the other platted developments would be directly affected by the D&RG conceptual alignments.						
² Alternative E would not displace populations in North Salt Lake, Woods Cross, or West Bountiful.						

Additional information is presented for Links 2 and 3 only in this and following sections because the impacts of the D&RG alignments vary from Alternative E in these two links only. Table 2.2-2 compares the identified relocations in Links 2 and 3.

Table 2.2-2 Relocations in Links 2 and 3

Alignment	Residential Displacements in Link 2	Residential Displacements in Link 3	Business Displacements in Link 2	Business Displacements in Link 3
Alternative E	0	0	2	1
DRG1	0	189	51	24
DRG2	3	189	11	24
DRG3	0	125	2	26
DRG4	0	124	2	8
DRG5	0	135	2	7

Community Cohesion

According to FHWA (Technical Advisory T 6640.8A, 1987), changes in neighborhoods, or community cohesion, can include splitting neighborhoods, isolating a portion of a neighborhood or an ethnic group, generating new development, changing property values, or separating residents from community facilities.⁷ All the D&RG conceptual alignments would place a four-lane freeway through established residential and commercial developments as well as through planned or newly developing areas. In many locations, these alignments would need to be elevated on bridges to cross surface streets and railroad tracks, and ramps with embankments and possibly elevated bridges would be required at locations with interchanges. Where surface streets are not routed over or under the alignment, they would be terminated with cul-de-sacs or frontage roads running parallel to the freeway, which would cut off movements across the alignment.

Because the D&RG alignments would be in close proximity to residential areas, UDOT's Noise Abatement Policy (UDOT 08A2-1) would likely require the installation of noise walls. UDOT's noise policy allows noise abatement for planned residential areas if development plans predate the environmental approval process for the transportation project. Because Legacy Parkway is proposed as a high-speed, controlled-access facility, the entire right-of-way would be fenced to keep pedestrians and bicyclists from crossing at unsafe locations. In some cases, the alignments would make it more difficult for residents to access schools, places of worship, community centers, and businesses, which would disrupt the residents' sense of community cohesion. Table 2.2-3 quantifies the physical barriers that would be created under each D&RG conceptual alignment and under the Alternative E alignment. These physical barriers would result in substantial adverse impacts on community cohesion in North Salt Lake, Woods Cross, and West Bountiful. Table 2.2-4 presents the percentages of the populations in each community that would be segmented by existing transportation facilities and facilities that would be created under each D&RG conceptual alignment and under the Alternative E alignment.

Public opinion from local communities has been consistent over the years, with an emphasis on keeping the Legacy Parkway alignment as far west as possible. Transportation agencies have placed a priority on minimizing the segmentation of developable lands in the existing communities, which includes new developments.

⁷ FHWA is required to look at community impacts in accordance with 23 USC 109 (h).

Table 2.2-3 Community Cohesion Impacts: Physical Barriers Created by Alignment

Alignment	Number of Bridges (Cross Streets)	Number of Cul-de-Sacs and Cut-Off Roads	Length of Noise Wall, m (ft)*	Length of Retaining Wall not Including Termini Interchanges, m (ft)*
Alternative E	4	4	0 (0)	500 (1,600)
DRG1	12	14	10,600 (34,800) 300 (33,700)	4,900 (16,100)
DRG2	12	22	13,800 (45,200)	4,900 (16,100)
DRG3	10	13	7,400 (24,400)	3,800 (12,600)
DRG4	10	12	7100 (23,300)	3,800 (12,400)
DRG5	10	12	7,600 (25,100)	3,100 (10,300)

Note:

* Estimates only. More detailed design would be required to calculate the exact lengths. Lengths were rounded to nearest hundred, and there may be discrepancies when converting units directly.

Table 2.2-4 Percentages of Population Segmented by Transportation Facilities within Each Community*

Alignment	West of Alignment	Between Roadway and D&RG	Between D&RG and UPRR	Between UPRR and I-15
North Salt Lake				
Alternative E	<1%	<1%	1%	19%
DRG1	<1%	<1%	1%	19%
DRG2	<1%	<1%	1%	19%
DRG3	<1%	<1%	1%	19%
DRG4	<1%	<1%	1%	19%
DRG5	<1%	<1%	1%	19%
Woods Cross				
Alternative E	2%	35%	6%	55%
DRG1	37%	0%	6%	55%
DRG2	33%	4%	6%	55%
DRG3	8%	29%	6%	55%
DRG4	4%	33%	6%	55%
DRG5	4%	33%	6%	55%
West Bountiful				
Alternative E	0%	35%	53%	12%
DRG1	28%	6%	53%	12%
DRG2	28%	6%	53%	12%
DRG3	28%	6%	53%	12%

Alignment	West of Alignment	Between Roadway and D&RG	Between D&RG and UPRR	Between UPRR and I-15
DRG4	24%	11%	53%	12%
DRG5	17%	18%	53%	12%

Note:

* Percentages are based on the population distribution in the 2000 U.S. Census. Numbers do not add up to 100% because there are portions of these populations that are east of I-15 and outside the study area.

Public School Service Area Impacts

The D&RG conceptual alignments divide the service areas of two schools in the Davis County School District: West Bountiful Elementary and Woods Cross Elementary. Alignments DRG1 and DRG2 divide the service areas of both schools; DRG3, DRG4, and DRG5 primarily divide the service area of West Bountiful Elementary. Alternative E passes west of most development on the western edge of the service area of West Bountiful Elementary. There is currently no housing west of Alternative E, except five houses in West Bountiful. The planned Legacy Nature Preserve would take up most of the land west of Alternative E, so future residential development west of Alternative E would be limited, and few future students would be affected.

A new elementary school will be constructed in 2007 as part of the Foxboro development. While no plans for the school currently exist, the school is planned to be located in the northwestern portion of the development. DRG1 and DRG2 would divide the service area of the school; DRG3, DRG4, and DRG5 would not have any impact on the school or access to the school.

Church Impacts

There are several buildings west of I-15 affiliated with the Church of Jesus Christ of Latter-day Saints (LDS). Congregations of this church, called wards, are defined by geographic boundaries. General conclusions regarding the community cohesion impacts on church members were based on the geographic relationships between D&RG alignments, church locations, and residential areas.

The D&RG conceptual alignments would likely divide several established LDS wards. Members of these wards would experience minor adverse impacts because they would need to follow major streets to cross the highway. The LDS church leadership could possibly redraw the ward boundaries so that the highway did not divide wards. There would be no impacts on church buildings associated with Alternative E.

Travel Patterns, Accessibility, and Walkability

The D&RG conceptual alignments would divide communities, school districts, and LDS church wards, and would create cul-de-sacs, dead-end streets, and bridges with ramps on earthen embankments. These changes would have a major impact on local travel patterns. Trips that currently are relatively direct on gridded street patterns would instead require circuitous routes to access an overpass or underpass to cross the highway.

All the D&RG conceptual alignments would adversely affect community walkability by introducing another physical barrier to pedestrians in a corridor that is already divided by the UPRR tracks and I-15. Because Alternative E mostly traverses the edge of existing and proposed future development where there are fewer reasons for residents to cross the alignment, it would have little effect on local travel patterns.

Visual and Noise Impacts

The D&RG conceptual alignments would intersect established residential areas, as well as the previously mentioned new developments, causing major impacts on local viewsheds and increasing ambient noise levels in residential neighborhoods adjacent to the alignments. Areas with adjacent residential properties both developed and platted would likely qualify for noise walls according to UDOT's Noise Abatement Policy (UDOT 08A2-I). The noise walls would add to the height of the overall facility and would increase the visual impacts. The earthen ramps, elevated bridges, and fences would also cause visual impacts along the alignment (Table 2.2-3).

Table 2.2-5 identifies the number of existing and platted residential properties adjacent to the various alignments and the length of noise walls and retaining walls that would likely be constructed. These measurements are an indicator of the level of noise and visual impacts that could be anticipated. A higher number of residential properties adjacent to the alignment indicates a greater number of people directly affected by noise and visual impacts. A longer noise wall indicates a higher level of visual impacts and a longer portion of the alignment that is likely to experience noise impacts. A longer retaining wall indicates a longer portion of the alignment that would be raised and subject to visual impacts.

Table 2.2-5 Noise and Visual Impacts

Alignment	Residential Properties adjacent to Alignment (Platted Lots adjacent to Alignment)	Length of Noise Wall, m (ft)*	Length of Retaining Wall not Including Termini Interchanges, m (ft)*
Alternative E	7 (0)	0 (0)	500 (1,600)
DRG1	125 (0)	10,600 (34,800)	4,900 (16,100)
DRG2	129 (32)	13,800 (45,200)	4,900 (16,100)
DRG3	115 (26)	7,400 (24,400)	3,800 (12,600)
DRG4	89 (26)	7,100 (23,300)	3,800 (12,400)
DRG5	114 (26)	7,600 (25,000)	3,100 (10,300)

Note:

* Estimates only. More detailed design would be required to calculate the exact lengths. No noise walls are required for Alternative E because residential development plans were designed with the knowledge of a highway along the Alternative E alignment. There are no newly platted lots adjacent to Alternative E because the new development plans include a buffer strip, park, or open space between the residential lots and the Alternative E right-of-way.

Environmental Justice

Environmental justice addresses the proportionality of impacts of a project; that is, whether the adverse impacts of a project's construction and operation are disproportionately borne by minority or low-income households (Executive Order 12898). Conversely, environmental justice also considers whether these households share the positive impacts of a project. The D&RG alternatives and Alternative E were analyzed for environmental justice issues using FHWA-recommended procedures. No environmental justice issues were identified.

2.2.3.2 Impacts on Wetlands

This section summarizes the wetlands impacts associated with the D&RG conceptual alignments in the D&RG regional corridor and Alternative E in the Great Salt Lake regional corridor. As part of this analysis, the D&RG alignments were surveyed in July 2003 for wetlands not previously delineated for the evaluation in the Final EIS.⁸ Based on more refined wetland identification, the wetland impacts in the D&RG regional corridor and the Great Salt Lake regional corridor would now both be characterized as *medium* rather than *low* and *medium*, respectively, as stated in the Final EIS. The analysis identifies 42–46 ha (105–114 ac) of wetlands within the D&RG conceptual alignment rights-of-way, as compared to 46 ha (113 ac) for Alternative E, and 36–39 ha (90–97 ac) of wetlands impacts within the footprints of the D&RG conceptual alignments, as compared to 42 ha [103 ac] for Alternative E). Acreage of wetlands impacts were calculated by determining the acreage in the alignment right-of-way and the acreage that would likely fall within the footprint of the roadway. Through final detailed design for Alternative E, UDOT determined that 4ha (10 ac) of wetlands within the right-of-way—primarily in the north (Link 5) and south (Link 1) interchanges, where all the D&RG alignments and Alternative E are the same—would not be affected by highway construction. These interchange areas would be similar under all alternatives because the design of the interchanges is based on the area needed to accommodate the ramps that connect to the roadway, not the right-of-way of the roadway itself. Therefore, this 4-ha (10-ac) reduction of wetlands impacts applies to all alternatives. For the D&RG alignments, the wetland impacts would be further reduced by the use of a narrower 80-m (264-ft) right-of-way in wetland areas. The reduction varies for the D&RG alignments. Considering just the highway footprint (80 m [264 ft]) and not the entire right-of-way width for Alternative E, there is a potential to avoid up to 0.8 ha (2 ac) of wetlands impacts in addition to the wetland impacts avoided at the interchanges. To provide the most conservative picture of the possible wetland impacts, this potential reduction is not included in Table 2.2-6

Table 2.2-6 below identifies direct impacts on wetlands within the D&RG conceptual alignments and the Alternative E alignment. Direct impacts on wetlands associated with each D&RG alignment ranged from about 43 ha to 46 ha (105 ac to 114 ac), compared to about 46 ha (113 ac) under Alternative E. See Table 2.2-7 for wetlands impacts in Links 2 and 3. Wetlands impacts in Links 1, 4, and 5 are the same under all alternatives.

⁸ Reference materials used included National Wetlands Inventory mapping, aerial photography, and the *Intermountain (Region 8) List from the National List of Plant Species That Occur in Wetlands* (Reed 1988). Field surveys of the general composition of vegetation and hydrology were conducted on and adjacent to the right-of-way for the five D&RG conceptual alignments.

Table 2.2-6 Wetland Impacts (in Acres)

Alignment	Wetland Acres within ROW	Difference from Alt. E Based on ROW	Wetland Acres within Footprint*	Difference from Alt. E Based on Footprint
Alternative E	113	—	103	—
DRG1	105	-8	90	- 13
DRG2	114	+1	97	- 6
DRG3	111	-2	95	- 8
DRG4	110	-3	94	- 9
DRG5	106	-7	90	- 13

Note:

* This includes the 4 -ha (10 -ac) reduction in wetland impacts identified by the design-builder in the termini interchanges, which applies to all alternatives. For the D&RG alignments the reduction is also associated with the use of the variable 80-m (264-ft) footprint width in wetland areas and in areas of existing development; the acreage of this reduction varies for the D&RG alignments

Table 2.2-7 Acres of Wetlands Impacts in Right-of-Way in Links 2 and 3

Alignment	Link 2	Link 3	Total of Link 2 and Link 3
Alternative E	9	29	38
DRG1	7	23	30
DRG2	18	21	39
DRG3	9	26	35
DRG4	9	25	34
DRG5	9	21	30

2.2.3.3 Regional Corridor Cost Estimates and D&RG Conceptual Alignment-Specific Cost Estimates

The Final EIS evaluated five regional corridors, including the D&RG regional corridor, based on costs, wetland impacts, and impacts on existing development. The planning level approach evaluation, assumed a four-lane freeway within a 100-m (328-ft) development corridor. Cost estimates were based on a 100-m right-of-way and generalized bridge requirements (see page 2-26 of the Final EIS). To ensure that all relevant information was updated for the Supplemental EIS, the lead agencies also requested that the cost estimates for all five regional corridors evaluated in the Final EIS be updated and provided below in Table 2.2-8. The revised regional cost estimates show that the costs of the regional corridors have increased since June 2000 when the Final EIS cost estimates were prepared. The increase in the regional alignment cost estimates can be attributed primarily to inflation between 2000 and 2004 and to refining the cost-estimating assumptions and applying a consistent cost-estimating methodology.

Table 2.2-8 Updated Cost Estimates for Regional Corridors

Regional Corridor	Estimated Cost (in millions) ¹	
	Final EIS 2000 ²	Supplemental EIS 2004 ³
Antelope Island	\$1,400	\$1,525
Trans-Bay	\$1,460	\$1,868
Railroad		
Denver & Rio Grande	\$460	\$589
Union Pacific ⁴	\$1,900	\$1,702
Great Salt Lake	\$300	\$439
Farmington Bay	\$520	\$830

Notes:

¹ These cost estimates are essentially the base costs of an alignment within the regional corridor (including mitigation). Actual contracting involves additional costs such as pre-award engineering, stipends, and incentives, environmental oversight, and program management. It is standard practice to compare the base costs because the actual contracting expenditures can vary widely and cannot be accurately predicted (i.e., actual budget for Legacy Parkway was \$451, \$151 million more than the estimated \$300 million cost estimate presented in the Final EIS).

² Source: Federal Highway Administration et al. 2000.

³ Source: Appendix G, *Updated Cost Estimates*. These cost estimates were calculated on the basis of an overall length and width of a highway within the various regional corridors and on rough quantity estimates including earthwork, right-of-way, and bridges.

⁴ The cost estimate for the Union Pacific Railroad regional alignment was reduced since the Final EIS. This is because the estimate for this regional alignment was done at a different level of detail for the Final EIS due to the fact that it was an active line and alternatives within that regional alignment would require relocating a major refinery. Therefore, a macro-scale (less detailed) calculation was appropriate.

Cost estimates also were developed for the five conceptual alignments within the D&RG regional corridor and for a conceptual alignment following Alternative E, based on a variable right-of-way of between 80 m and 95 m (264 ft and 312 ft). Conceptual alignment Alternative E is distinguished to indicate that the cost estimates were prepared using the same methodology as was used for the conceptual D&RG alignments. Table 2.2-9 presents the cost estimates for each D&RG conceptual alignment.

Table 2.2-9 D&RG Conceptual Alignment-Specific Cost Estimates

Conceptual Alignment	Length Variation from Alternative E (miles) ¹	Length along D&RG Railroad (miles)	Alignment-Specific Cost Estimates 2005 (millions) ²	Cost Difference from Alternative E (millions)	Percent Increase over Alternative E
Alternative E	—	—	\$442	—	—
DRG1	6.2	4.5	\$698	\$256	58%
DRG2	6.2	3.6	\$665	\$223	50%
DRG3	4.5	2.5	\$596	\$154	35%
DRG4	4.4	2.2	\$578	\$136	31%
DRG5	4.3	1.5	\$576	\$134	30%

Note:

¹ Length variation is the length, in miles, that the D&RG alignments differ from Alternative E. For the remainder of the total 14 miles of the North Corridor, the alternative alignments are identical.

² Alignment-specific cost estimates were revised after the Draft Supplemental EIS and are based on review by FHWA. Costs represent updated material quantity estimates and reflect 2005 prices.

Because cost estimates are identical in Links 1, 4, and 5, the primary cost differences between alignments occur in Links 2 and 3. Table 2.2-10 provides the estimated costs of Link 2 and 3 for a comparison between D&RG alignments and Alternative E.

Table 2.2-10 Alignment-Specific Cost Estimates for Links 2 and 3 (millions)

Alignment	Link 2*	Link 3	Total Cost Estimate of Links 2 and 3
Alternative E	\$23	\$80	103
DRG1	\$126	\$233	359
DRG2	\$92	\$233	325
DRG3	\$23	\$234	257
DRG4	\$23	\$216	239
DRG5	\$23	\$214	237

2.2.3.4 Summary of Impacts

Table 2.2-11 summarizes the quantifiable impacts of the D&RG evaluation for all D&RG conceptual alignments and Alternative E. The D&RG analysis determined that the impacts of the D&RG conceptual alignments and Alternative E differ only in Links 2 and 3 because the D&RG alignments and Alternative E share much of the same alignment in Links 1, 4, and 5. To compare impacts of the D&RG alignments to those of Alternative E, Table 2.2-12 identifies the impacts in Links 2 and 3 for all D&RG alignments and Alternative E.

Table 2.2-12 Summary of Cost Estimates, Wetlands Impacts, and Impacts on Existing Development for Links 2 and 3

Alignment	Estimated Costs (millions)	Wetlands in the Right-of-Way (acres)	Impacts on Existing Development							
			Link 2				Link 3			
			Relocations		Possible Relocations		Relocations		Possible Relocations	
			Residence (parcels)	Business (parcel)	Platted Lot	Residence (parcels)	Business (parcels)	Platted Lot	Residence (parcels)	Business (parcels)
Alt E	\$23	\$80	9	29	0	2	0	0	1	0
DRG1	\$126	\$233	7	23	0	51	0	189	24	0
DRG2	\$92	\$233	18	21	3	11	70	189	24	0
DRG3	\$23	\$234	9	26	0	2	0	125	26	36
DRG4	\$23	\$216	9	25	0	2	0	124	8	36
DRG5	\$23	\$214	9	21	0	2	0	135	7	36

2.2.4 Conclusions

2.2.4.1 Impacts on Aquatic Resources

Table 2.2-11 summarizes and compares the quantitative impacts of Alternative E and each D&RG alignment. The analysis shows that highway facility alternatives in both the Great Salt Lake corridor (Alternative E) and the D&RG regional corridor would likely result in similar levels of impacts on wetlands. There would be approximately 43 to 46 ha (105 to 114 ac) of wetlands within the D&RG alignment right-of-way compared to 46 ha (113 ac) under Alternative E. Estimated direct footprint impacts within the rights-of-way are approximately 36 to 39 ha (90 to 97 ac) of wetlands impacts within the D&RG alignments and 42 ha (103 ac) under Alternative E. (See Section 2.1, *Right-of-Way Issues*, and Section 3.3.1 for explanation of roadway footprint versus right-of-way.) Table 2.2-12 shows that fewer impacts would occur on wetlands under the D&RG alternatives in only two links (Links 2 and 3); Links 1, 4, and 5 would have identical wetland impacts to Alternative E. In Link 2, DRG1 (the alignment in Link 2 that affects the least acreage of wetlands) would affect 0.81 ha (2 ac) fewer wetlands than Alternative E. In Link 3, DRG2 and DRG 5 (the alignments in Link 3 that affect the least acreage of wetlands) would affect 3 ha (8 ac) fewer wetlands than Alternative E.

2.2.4.2 Practicability Considerations

Although implementation of an alternative in the D&RG regional corridor could result in fewer impacts on wetlands than Alternative E, the lead agencies have determined that an alignment in the D&RG corridor is not practicable because of logistics and cost considerations. In the CWA regulations, *practicable* is defined as “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” If an alternative is not practicable, the Corps can eliminate that alternative from further consideration. In addition, under NEPA, if an

Table 2.2-11 Summary of Quantitative Impacts by Alignment

				Impacts on Existing Development									
				Relocations			Potential Relocations	Utilities	Travel Patterns		Noise and Visual Impacts		
Conceptual Alignment	Total Cost Estimate (millions)	Footprint (acres)	ROW (acres)	Residential (Parcels)	Business (parcels)	Total Relocations	Platted Lots	Major Utility Impacts (Total)	Bridges (Cross Streets)	Cul-de-Sacs and Cut-Off Roads	Residential Properties Adjacent to ROW (platted lots)	Length of Noise Wall, m (ft)	Length of Retaining Wall not Including Termini Interchanges, m (ft)
Alternative E	\$442	103	113	4	14	18	0	21	4	4	7 (0)	0 (0)	500 (1,600)
DRG1	\$698	90	105	193	86	279	0	28	12	14	125 (32)	10,600 (34,800)	4,900 (16,100)
DRG2	\$665	97	114	196	46	242	Foxboro –70	22	12	22	129 (26)	13,800 (45,200)	4,900 (16,100)
DRG3	\$596	95	111	129	39	168	Mountain View –36	13	10	13	115 (26)	7,400 (24,400)	3,800 (12,600)
DRG4	\$578	94	110	128	21	149	Mountain View –36	14	10	12	89 (26)	7,100 (23,300)	3,800 (12,600)
DRG5	\$576	90	106	139	20	159	Mountain View –36	14	10	12	114 (26)	7,600 (25,000)	3,100 (10,300)

alternative does not meet the project purpose and need or does not meet other criteria for reasonableness and feasibility, the lead agencies can eliminate that alternative from further consideration. See Chapter 3, Section 3.2.1 for a discussion of the reasonableness and feasibility screening criteria used to evaluate alternatives. The following summarizes the lead agencies' findings regarding the practicability of constructing an alignment in the D&RG regional corridor.

Cost

As illustrated in Table 2.2-11, the cost estimates of the conceptual D&RG alignments range between \$576 million and \$698 million, which is between \$134 million and \$256 million more than conceptual alignment Alternative E (see Appendix G, *Updated Cost Estimates*). As with all cost comparisons in this Supplemental EIS, these costs are based on dollar costs to acquire lands needed for the project and the costs of construction and mitigation for impacts on wetlands. The lead agencies recognize that actual future costs will include components not reflected in these figures, including UDOT costs of project oversight, environmental evaluations, contractor incentives, and appropriate adjustments for the time value of money (inflation), which is why cost figures addressed in the Utah State Legislature in connection with UDOT requests for funding are higher than the cost estimates presented in this Supplemental EIS. The lead agencies also recognize that these additional cost categories are applicable to all alternatives in determining whether an alternative within the D&RG regional corridor was reasonable, and, in particular the Corps acknowledges these additional cost categories in determining whether such an alternative would be practicable. On the basis of cost alone, some of the D&RG alignments may be considered practicable. However, the higher construction costs in addition to the exceptional logistical constraints (discussed below) make the D&RG regional corridor impracticable.

Existing Technology

Alternatives within both the Great Salt Lake (including Alternative E) and D&RG regional corridors (including Alternatives D&RG 1–5) would be practicable from a technological point of view. There are no constraints of existing technology that would make either set of alternatives impossible to construct.

Logistics

Although not defined specifically in the CWA regulations, for the purposes of this Supplemental EIS, the Corps considers an alternative to be logistically impracticable if any of the details associated with implementing that alternative—including not only direct construction impacts such as the relocation of homes or businesses, but also resulting neighborhood changes—make it infeasible. This definition was substantiated in the appellate court decision in which the court determined that the Corps' decision to eliminate the D&RG alignment in the June 2000 Final EIS due to high cost and high impacts on existing development was not arbitrary or capricious because "...impacts on existing development would appear to fall within both the cost and logistics portion of the practicable definition." (*Utahns for Better Transportation et al v. U.S. Department of Transportation et al.* [305 F.3d 1152 (10th Cir. 2002)]).

The five alignments in the D&RG regional corridor were located to avoid wetlands, existing development, hazardous waste sites, and Section 4(f) properties to the extent possible. Even after strategic placement of the D&RG alignments, they would still require relocating between 149 and 279 residential and commercial properties, compared to a total of 18 relocations under Alternative E (Table 2.2-11). The relocations for the D&RG alignments would account for about 3 and 10 percent of the total residences in Woods Cross and West Bountiful, respectively. Alternative E would not affect any residential properties in either of those communities.

The D&RG alignments would also have substantially greater impacts on properties that would not be relocated but would remain along the alignments. Because the D&RG alignments pass directly through developed, established neighborhoods (as opposed to Alternative E, which skirts the western edge of development), they would have considerably more impacts on community cohesion, such as requiring between 12 and 22 cut-off roadways compared to four under Alternative E. The D&RG conceptual alignments would also sever 30 percent of the West Bountiful community to the west of the D&RG conceptual alignments. In addition, the D&RG conceptual alignments would have far greater noise and visual impacts than Alternative E. Between 89 and 129 residential properties would front the freeway under the D&RG alignments (including newly platted lots it would be between 115 and 161 properties) compared to seven under Alternative E. The length of noise walls and retaining walls—two additional indicators of noise and visual impacts on remaining development—would likewise be substantially greater under the D&RG alignments.

The lead agencies consider logistically impracticable those alternatives that cannot be strategically placed to avoid a high number of homes and businesses and a high amount of neighborhood disruption and tax base impacts on established communities. Therefore, impacts that would occur on existing development and the cohesion of communities in the study area make the alignments in the D&RG regional corridor unreasonable and logistically impracticable.